Insights into *Chlamydia trachomatis* cumulative incidence in the context of widespread opportunistic chlamydia screening in England: Seroprevalence study using sera from a nationally-representative household survey

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INTRODUCTION

- Opportunistic screening of <25 year-olds for genital *Chlamydia trachomatis* infection ('chlamydia') was nationally-implemented in England in 2008 but its impact is poorly understood.
- Antibodies to *C.trachomatis* persist following infection, thus providing a marker of past infection.
- We undertook a serial population seroprevalence study to explore the impact of screening on cumulative incidence of chlamydia as measured by *C.trachomatis* antibodies.

METHODS

- We used anonymised sera from participants in the nationally-representative Health Surveys for England (HSE).
- Samples were tested for *C.trachomatis* antibodies using two novel in-house Pgp3 ELISAs[1,2].
- All sera were tested using an indirect Pgp3 ELISA (sensitivity: 73.8% in women, 44.2% in men; specificity: 97.6%)[1]. Samples with absorbance values around the cutoff value were retested using a more sensitive ELISA (sensitivity: 82.9%in women; 54.4%, in men; specificity: 97.8%)[2].
- Determinants of being seropositive were explored using logistic regression among 16-44 year-old women and men in 2010/2012 (years when sexual behaviour questions were included in the survey)(n=1,402 women; 1,119 men).
- Seroprevalence trends among 16-24 year-old women (n=3,361) were investigated over ten time points from 1994-2012. Trends in men were not investigated due to the lower sensitivity of the assay in men[1,2].
- Survey weights were applied to correct for uneven probability of selection and non-response.

RESULTS

Pgp3 seroprevalence in 2010/2012 (16 to 44 year-old women and men)

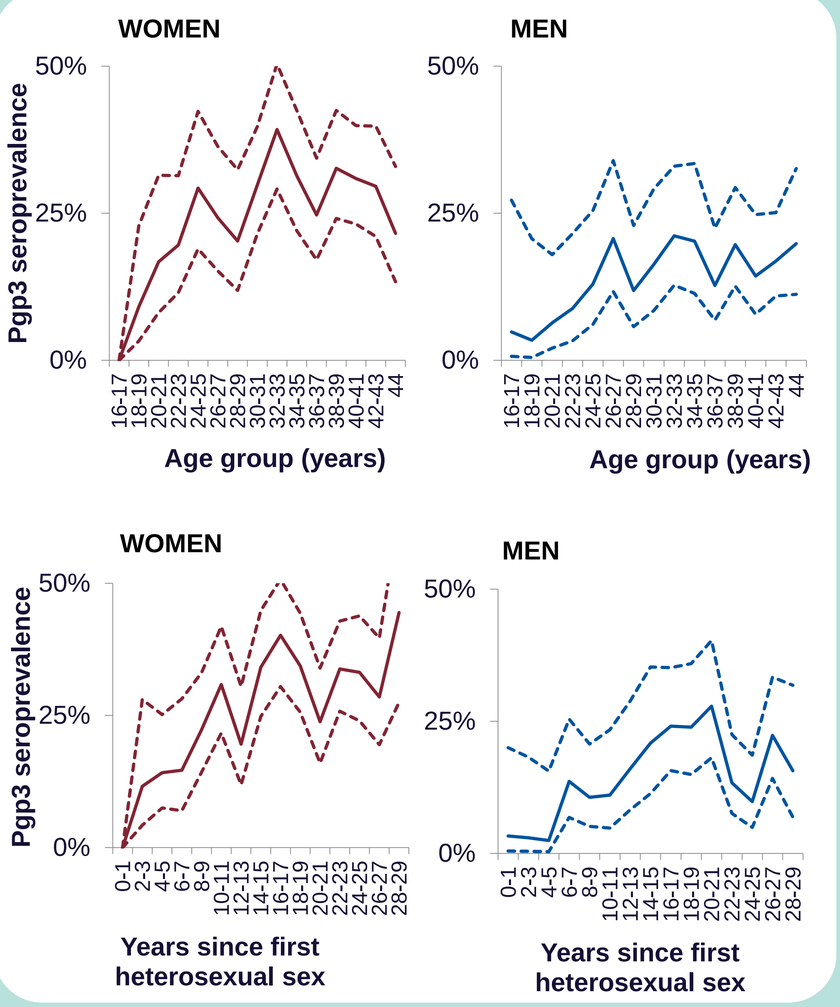

Figure 1: Pgp3 seroprevalence by age group and years since first sex

- In HSE2010/12, Pgp3 seroprevalence among 16-44 year-olds was 24.4% (95%CI 22.0%-27.1%) in women and 13.9% (95%CI 11.8%-16.25) in men.
- Seroprevalence increased with age and years since first sex (Fig.1).
- 33.5% (95%CI 27.5%-40.2%) of 30-34 year-old women and 18.7% (13.4%-25.6%) of 35-39 year-old men were Pgp3 seropositive.

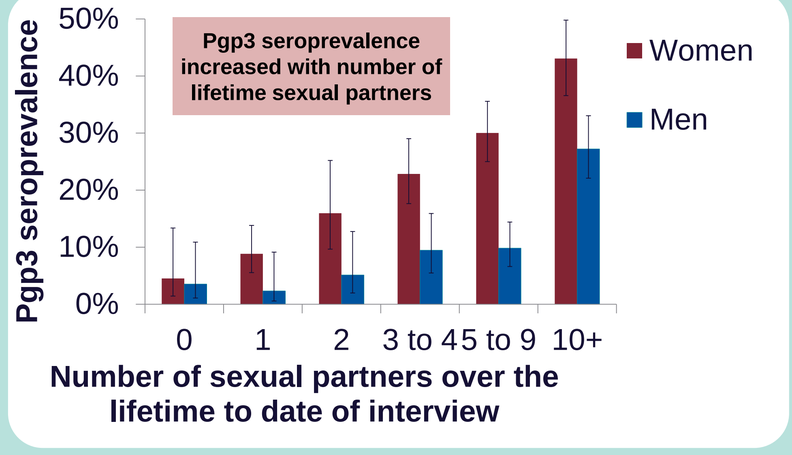

Figure 2: Pgp3 seroprevalence by number of lifetime sexual partners (16-44 year-olds)

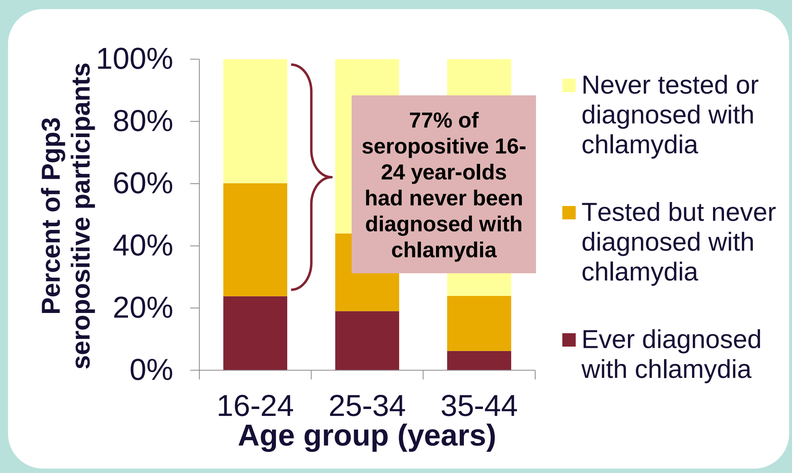

Figure 3: Percentage of Pgp3 seropositive participants reporting chlamydia testing and/or diagnosis

- Number of lifetime sexual partners was significantly associated with being seropositive (≥10 versus 1-4: OR 3.84 [95%CI 2.68-5.51] women, 5.95 (3.41-10.35) men (Fig.2)
- 77% of seropositive 16-24 year-olds had never been diagnosed with chlamydia; 36% had been tested, but never diagnosed (Fig.3)

Pgp3 seroprevalence over time (16 to 24 year-old women)

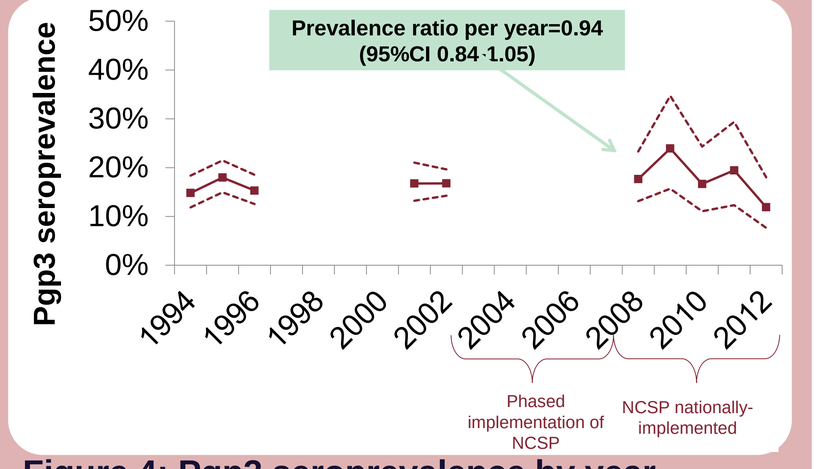

Figure 4: Pgp3 seroprevalence by year (16-24 year-old women)

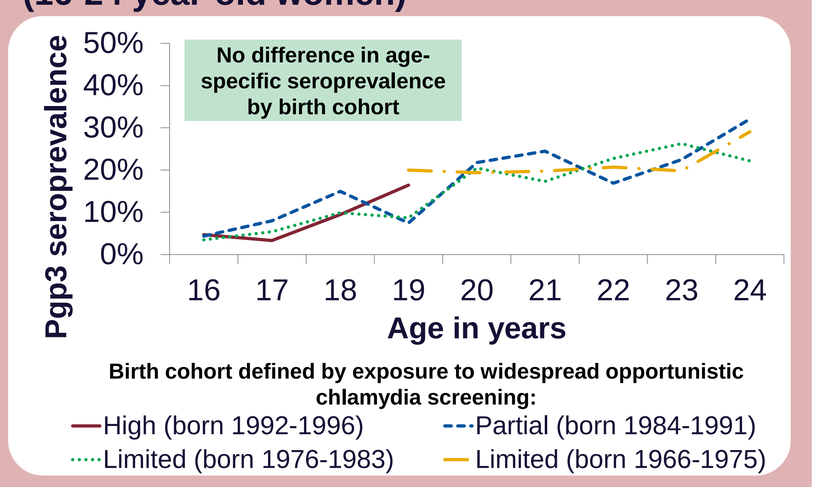

Figure 5: Pgp3 seroprevalence by birth cohort (16-24 year-old women)

- A non-significant decline was observed from 2008-2012 (prevalence ratio per year: 0.94, 95%CI 0.84-1.05) (Fig.4).
- Although only partial data were available on those with high exposure to screening, there was no indication of a difference in the age-specific seroprevalence by birth cohort, with similar age curves seen in each group (Fig.5).

DISCUSSION

- In 2010/12, one quarter of women aged 16 to 44 and one in three of those aged 30 to 34 had evidence of a previous antibody-inducing chlamydia infection.
- Given the sensitivity of the double-antigen ELISA, the proportion of the population ever infected with chlamydia would be even higher.
- Being Pgp3 seropositive was strongly associated with increasing age and numbers of lifetime sexual partners.
- There was no significant trend in age-specific Pgp3 seroprevalence over time or between birth cohorts exposed to different levels of opportunistic chlamydia screening

LIMITATIONS

- Our analysis of trends in seroprevalence may be limited by time since implementation of the NCSP and limited sample size.
- Behavioural data were self-reported; sensitive items were collected using the self-completion booklet to minimise social desirability bias.
- Seroprevalence patterns in men should be interpreted with caution given the relatively low sensitivity of the assay in men.

CONCLUSIONS

- Our application of Pgp3 ELISAs demonstrates a high lifetime risk of chlamydia infection among women and a large proportion of undiagnosed infections.
- A decrease in age-specific cumulative incidence following national implementation of opportunistic chlamydia screening has not yet been demonstrated.
- We propose these assays be used to assess impact of chlamydia control programmes.

ACKNOWLEDGEMENTS

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